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Amendment and Response

Applicant: Rory A. Heim et al.

Serial No.: 09/851,765

Filed: May 9, 2001

Docket No.: 10006454-1

Title: METHOD AND APPARATUS FOR COMPENSATING FOR INK CONTAINER EXTRACTION CHARACTERISTICS

IN THE CLAIMS

Please add new claims 22-36.

Please amend claims 9, 16, 20 and 21 as follows:

1. (Previously presented) An inkjet printing system configured for receiving a replaceable ink container, the replaceable ink container having ink extraction characteristics that vary with ink extraction, the inkjet printing system comprising:
an ink extraction control device for determining ink extracted from the replaceable ink container and for selecting an ink usage rate print mode from a plurality of different ink usage rate print modes based on ink extraction characteristics of the replaceable ink container.
2. (Original) The inkjet printing system of claim 1, wherein the ink extraction control device selects the ink usage rate print mode for selectively pausing printing to reduce an average ink usage rate.
3. (Previously presented) An inkjet printing system configured for receiving a replaceable ink container, the replaceable ink container having ink extraction characteristics that vary with ink extraction, the inkjet printing system comprising:
an ink extraction control device for determining ink extracted from the replaceable ink container and for selecting a print mode from a plurality of different print modes based on ink extraction characteristics of the replaceable ink container, wherein each print mode of the plurality of different print modes has a different pause value associated therewith.
4. (Previously presented) The inkjet printing system of claim 1 wherein the plurality of different ink usage rate print modes includes at least a first printing mode with a first ink usage rate and at least a second printing mode with a second ink usage rate different from the first ink usage rate.

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5. (Original) The inkjet printing system of claim 1 wherein the replaceable ink container has ink extraction characteristics that vary with the ink level within the replaceable ink container.

6. (Previously presented) The inkjet printing system of claim 1 wherein the replaceable ink container has a gauge pressure characteristic based on ink usage which varies with ink level within the ink container.

7. (Previously presented) The inkjet printing system of claim 1 wherein ink extraction characteristics are stored on an electrical storage device associated with the replaceable ink container, and wherein the ink extraction characteristics are provided to the control device after installation of the replaceable ink container into the inkjet printing system.

8. (Original) The inkjet printing system of claim 7 wherein the information storage device is a semiconductor storage device.

9. (Currently Amended) An inkjet printing system having a printhead responsive to control signals for depositing ink on media and an ink delivery system for delivering ink to the printhead, the inkjet printing system comprising:

a monitoring and control device for monitoring ink extracted from the ink delivery system and delivered to the printhead by the ink delivery system, and for adjusting rate of ink extraction from the ink delivery system during a print operation based on ink deposited on media and ink delivered to the printhead.

10. (Previously presented) The inkjet printing system of claim 9 wherein the monitoring and control device adjusts rate of ink extraction from the ink delivery system based on a rate of ink deposited on media and a rate of ink delivered to the printhead.

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11. (Previously presented) The inkjet printing system of claim 9 wherein the monitoring and control device determines ink delivered to the printhead based on ink extraction characteristics of an ink container.

12. (Previously presented) The inkjet printing system of claim 11 wherein the monitoring and control device determines an amount of ink delivered to the printhead over a given time interval based on an extraction rate for an ink container that is determined based on ink remaining in the ink container.

13. (Previously presented) The inkjet printing system of claim 9 wherein the monitoring and control device adjusts rate of ink extraction from the ink delivery system to prevent the rate of ink extraction from the ink delivery system from exceeding a rate of ink ejected from the printhead by more than a threshold value.

14. (Previously presented) The inkjet printing system of claim 9 wherein the monitoring and control device adjusts rate of ink extraction from the ink delivery system by selectively pausing printing to reduce an average rate of ink extraction from the ink delivery system.

15. (Previously presented) The inkjet printing system of claim 9 wherein the monitoring and control device adjusts rate of ink extraction from the ink delivery system by selectively controlling numbers of nozzles activated.

16. (Currently Amended) A method for operating a printing system having a printhead and a supply of ink separate from the printhead, the method comprising:

 determining ink flow from the printhead;

 determining ink flow into the printhead; and

 adjusting a rate of ink ~~extraction from the supply of ink~~ flow into the printhead

 during a print operation if the ink flow from the printhead exceeds ink flow into the printhead by a threshold amount.

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17. (Previously presented) The method claim 16 wherein the determining ink flow from the printhead is based on drop counting.

18. (Previously presented) The method of claim 16 wherein the determining ink flow into the printhead is based on ink extraction characteristics of the supply of ink.

19. (Previously presented) The method of claim 18 wherein the determining ink flow into the printhead is based on ink level within the supply of ink.

20. (Currently Amended) The method of claim 16 wherein the adjusting the rate of ink flow into the printhead extraction from the supply of ink is selectively inserting a pause between successive print swaths to reduce an average rate of ink extraction from the supply of ink flow into the printhead for successive print swaths.

21. (Currently Amended) The method of claim 16 wherein the adjusting the rate of ink flow into the printhead extraction from the supply of ink is selectively limiting the number of nozzles activated on the printhead.

22. (New) An inkjet printing system comprising:
a printhead that ejects ink;
an ink delivery system that provides ink to the printhead; and
a controller that determines an amount of ink from the ink delivery system that is provided to the printhead, the controller adjusting a rate that ink from the ink delivery system is provided to the printhead during a print operation based on an amount of ink to be ejected and an amount of ink provided to the printhead.

23. (New) The inkjet printing system of claim 22 wherein the controller selects an ink usage rate print mode that pauses printing to reduce an average ink usage rate during the print operation.

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24. (New) The inkjet printing system of claim 23 wherein the plurality of different ink usage rate print modes includes at least a first printing mode with a first ink usage rate and at least a second printing mode with a second ink usage rate different from the first ink usage rate.

25. (New) The inkjet printing system of claim 22 wherein the ink delivery system comprises an ink container and wherein the controller determines the amount of ink delivered to the printhead based on ink extraction characteristics of the ink container.

26. (New) The inkjet printing system of claim 25 wherein the controller determines the amount of ink provided to the printhead during a given time interval based on an extraction rate for an amount of ink remaining in the ink container.

27. (New) The inkjet printing system of claim 25 wherein the controller adjusts a rate of ink extraction from the ink delivery system to prevent the rate of ink extraction from the ink delivery system from exceeding a rate of ink ejected from the printhead by more than a threshold value.

28. (New) The inkjet printing system of claim 22 wherein the controller adjusts a rate of ink provided to the printhead by selectively controlling a number of nozzles that eject ink during portions of the print operation.

29. (New) The inkjet printing system of claim 22 wherein the ink deliver system is coupled to an ink supply from which ink is provided to the printhead.

30. (New) A method for operating a printing system having a printhead and an ink supply, the method comprises:
 - determining ink ejection by the printhead;
 - determining ink flow into the printhead; and

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adjusting a rate of ink flow into the printhead during a print operation if a rate of ink ejected by the printhead is greater than the rate of ink flow into the printhead by a threshold amount.

31. (New) The method of claim 30 wherein determining ejection by the printhead is based on counting a number of ejections by the printhead.

32. (New) The method of claim 31 wherin the printhead comprises a plurality of nozzles that eject ink and wherein counting a number of ejections by the printhead comprises counting a number of nozzles that eject ink.

33. (New) The method of claim 30 wherein determining ink flow into the printhead is based on ink extraction characteristics of the supply of ink.

34. (New) The method of claim 30 wherein determining ink flow into the printhead is based on an ink level in the supply of ink.

35. (New) The method of claim 30 wherein adjusting the rate of ink flow into the printhead comprises selectively pausing printing between successive print swaths of a print operation to reduce an average rate of ink flow into the printhead.

36. (New) The method of claim 30 wherein adjusting the rate of ink flow into the printhead comprises selectively limiting a number of nozzles activated on the printhead during at least a portion of the print operation.